Q- Three charges are placed at the vertices of an equilateral triangle of side a = 6 cm. q_A = +3 μC, q_B = +3 μC, and q_C = -3 μC.

(a) Find the x- and y- components of the electric force acting on q_C.

The force between two point charges is given by Coulomb's law.

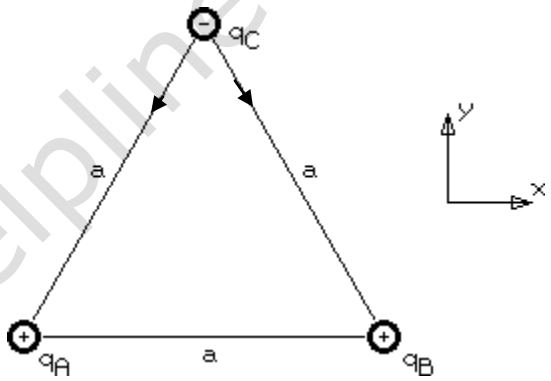
Magnitude of the forces on q_c due to the other charges will be the equal and given by

$$F = \frac{q_A q_C}{4\pi \in_0 a^2} = \frac{9*10^9 * \left(3*10^{-6}\right)\left(-3*10^{-6}\right)}{0.06^2} = -22.5N$$

Negative sign shows that this is the force of attraction.

The directions of these two equal forces are making an angle 60^0 and hence their resultant will bisect the angle means in negative y direction and its magnitude is given by

$$F_y = 2F\cos(30^0) = 2*22.5*0.866 = 38.97N$$



Hence

F_x = 0 N

F_y = - 39 N

(b) Find the electric field at the position of q_C due to q_A and q_B.

The electric field will be given by

Ey = Fy/qc = - 39/(- $3*10^{-6}$) = $1.3*10^7$ N/C

E_x = 0 N/C

E_y = $1.299*10^7$ N/C

Thus the electric field is $1.3*10^7$ N/C along the positive y direction.